

REMARKS

In view of the above amendments and the following remarks, reconsideration of the rejections contained in the Office Action of August 22, 2006 is respectfully requested.

The Examiner rejected pending claims 7-14 as being unpatentable over the Cheng reference (US 6,703,317) or the Pan reference (US 2003/0235994) in view of the Misumi reference (US 5,492,862). However, as discussed in detail with the Examiner during the telephone interview on December 19, 2006, the Applicants respectfully submit that the Misumi reference does not teach or even suggest the features asserted by the Examiner. The Applicants will now briefly summarize below the points made to the Examiner during the interview.

As explained on page 2 of the original specification, substrates to be processed accumulate and store charges due, for example, to static electricity acquired while the substrates are being moved. Unfortunately, these stored charges often cause damage to the processed substrate due to dielectric breakdown.

The present invention has been developed to address the above problem. In particular, claim 7 recites a method of forming a thin-film circuit by applying a high-frequency power to an electrode for supporting a substrate. A top surface and a bottom surface of the substrate are *simultaneously* subjected to a charge-neutralization plasma *while the substrate is separated from the electrode* so that electric charges on the substrate are neutralized. These features are described on page 20, line 25 through page 21, line 22 of the original specification. As a result, the top surface and the bottom surface of the substrate are made equal in potential, so that damage that often occurred during conventional plasma processing methods due to accumulated charges on a substrate can be eliminated (see page 14, line 22 through page 15, line 7 of the original specification).

At the bottom of page 3 of the Office Action, the Examiner acknowledged that the Cheng reference and the Pan reference do not teach that the top surface and the bottom surface of a wafer (i.e., a substrate) are *simultaneously* subjected to plasma in the inert gas. Although not specifically acknowledged by the Examiner, the Cheng reference and the Pan reference also do not teach or suggest simultaneously subjecting the top surface and the bottom surface of the

substrate to the charge-neutralization plasma *while the substrate is separated from the electrode*. Nonetheless, the Examiner asserted that the Misumi reference at least suggests these features. However, as discussed with the Examiner during the telephone interview, the Applicants do not agree with the Examiner's interpretation of the Misumi reference.

As illustrated in Figure 3 and generally described in column 2, line 65 through column 3, line 17 of the Misumi reference, a process chamber 3 in which plasma processing on wafers 4 takes place includes a handling device 11 for removing a wafer 4 from a cassette 9, placing the wafer on a treatment table 5 within the process chamber 3, and then returning the wafer 4 from the treatment table 5 to the cassette 9 (see, specifically, column 2, lines 65 through column 3, line 2 of the Misumi reference).

As further illustrated in Figure 3 of the Misumi reference, a lifter 20 includes pins 19 for holding the wafer 4. In the outstanding Office Action, the Examiner appeared to assert that the pins 19 support the wafer 4 so that both sides of the wafer will be exposed to plasma in the process chamber 3 simultaneously. However, as explained to the Examiner during the telephone interview, the Misumi reference provides no such teaching or suggestion. In contrast, the Misumi reference merely teaches that the pins 19 are arranged next to the handling device 11 and are capable of moving up and down so that the wafer 4 can be transported to or from an arm 15 of the handling device 11 by simply moving the pins 19 up and down (see column 3, lines 13-18 of the Misumi reference). There is absolutely no teaching or suggestion in the Misumi reference that the pins 19 lift the wafer 4 during a process of subjecting the wafer 4 to a charge-neutralization plasma so as to simultaneously exposed the top surface and the bottom surface of the wafer 4 to the plasma. In this regard, the Examiner is reminded that the pending claims are *method* claims. Therefore, even though the apparatus illustrated in Figure 3 of the Misumi reference *might be capable of* lifting the wafer 4 during a plasma process, there is simply no suggestion in the Misumi reference to perform this method step as recited in claim 7.

The Examiner is also requested to note that, as suggested during the telephone interview, independent claim 7 has now been slightly amended so as to further define the present invention

and further clarify the differences between the present invention and the Misumi reference. In particular, claim 7 has now been amended to recite that the top surface and the bottom surface of the substrate are simultaneously subjected to a charge-neutralization plasma while the substrate is separated from the electrode so that the electric charges on the substrate are neutralized *and so that the top surface and the bottom surface of the substrate are made substantially equal in potential*. The reference to the portions of the original disclosure which provide support for this amendment has been provided above. The Applicants also note that the Examiner indicated during the telephone interview that this amendment would be entered if submitted despite the finality of the outstanding Office Action.

As explained above, the Cheng reference, the Pan reference, and the Misumi reference do not, either alone or in combination, teach or even suggest a method in which a top surface and a bottom surface of a substrate are *simultaneously* subjected to a charge-neutralization plasma *while the substrate is separated from an electrode* so that the electric charges on the substrate are neutralized and so that the top surface and the bottom surface of the substrate are made *substantially equal in potential*. Therefore, one of ordinary skill in the art would not be motivated to modify or combine these references so as to obtain the invention recited in amended independent claim 7. Accordingly, it is respectfully submitted that amended independent claim 7 and the claims that depend therefrom are clearly patentable over the prior art of record.

In addition to the distinctions between the present invention and the prior art as recited in independent claim 7 and discussed above, the Examiner is requested to note that dependent claim 13 recites additional subject matter that further distinguishes the present invention from the prior art. In particular, claim 13 recites that the level of the high-frequency power applied to the electrode during the step of simultaneously subjecting the top surface and the bottom surface of the substrate to the charge-neutralization plasma is *no more than 1/3 a level of the high-frequency power applied to the electrode during the plasma processing*. This feature and the advantages achieved therefrom are discussed on page 22, lines 17-25 of the original specification. In particular, this level of high-frequency power will generate relatively weak

plasma which is sufficient to remove accumulated charges on the substrate and render the top surface and the bottom surface of the substrate substantially equal in potential, as recited in claim 7. However, by maintaining the high-frequency power at a level no more than 1/3 the level of the high frequency power applied to the electrode during the plasma processing, the substrate will *not* be etched and a thin film will *not* be formed on the substrate (i.e., the substrate will not be inadvertently processed during application of the charge-neutralization plasma).

On page 5 of the Office Action, the Examiner asserted that the power level as recited in claim 13 is “simply a matter of optimization, which would be within the level of skill of one of ordinary skill in art.” Of course, it is well-established that only result-effective variables can be optimized. See *In re Antonie*, 559 F.2d 618, 196 USPQ 6 (CCPA 1977). As noted above, the specification of the present application clearly explains that maintaining the high-frequency power at the level specified in claim 13 provides significant advantages. However, the Examiner has provided no evidence that maintaining a level of high-frequency power at a specified point would have any effect on the application of the charge-neutralization plasma. Moreover, the prior art of record does not teach or even suggest this feature. Consequently, in addition to the reasons discussed above with respect to independent claim 7, it is respectfully submitted that dependent claim 13 recites additional subject matter that further distinguishes the present invention from the prior art.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. However, if the Examiner should have any comments or suggestions to help speed the prosecution of this application, the Examiner is requested to contact the Applicant's undersigned representative.

Respectfully submitted,

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